# REMARKS/ARGUMENTS

Applicants have made their arguments and remarks in the non-compliant amendment filed on 27 May 2003. The Notice of non-compliance mailed by the Office stated that Applicants need NOT re-submit the entire amendment.

Applicants once again apologize to the Commissioner, the Office and the Examiner and believe that this submission places the amendment in question in compliance.

Applicants' attorney wishes to inform the Office that he will be out of his office (a solo practice with no staff) from 10 September 2003 through 3 October 2003 and again from 12 October 2003 through 20 October 2003.

Respectfully submitted

C. W. Alworth, Registration Number 33,824
Alworth Law and Engineering'
Customer Number 027645
505 Cumberland Road
Tyler, Texas 75703-9325
Phone 903-534-0477 Ext 201
Facsimile 903-581-1441
calworth@alworth.com
Attorneys for Applicant

## CERTIFICATE OF EXPRESS MAILING UNDER 37 CFR 1.10(a)

I, C. W. Alworth, hereby certify that this Response to the First Office action in the above identified patent application, and the attachments, was properly placed (prepaid) in the Express Mail Service of the United States Postal Service – receipt number EV 247724444 US - on the 2nd day of September, 2003. Under the Rules of the Office, the Commissioner is hereby requested to assign the date of filing as the date of Express Mailing – namely 2 September 2003.

C. W. Alworth

EV247724444US

# VERSION WITH MARKINGS TO SHOW CHANGES MADE

VERSION WITH MARKINGS TO SHOW CHANGES

In the Specification

The paragraph beginning at line 21 page 3 has been amended as follows:

The two parts of the direction controller can be configured in a number of different ways. Preferably, the two parts are located on different sides of the central plane. A particularly preferable arrangement is achieved when both of the two parts are capable of applying a independent force to the mandrel. For example, the two parts may be located on either side of the central plane of the housing. For example, both parts may comprise eccentrically bored sleeves.

The paragraph beginning at line 1 page 4 has been amended as follows:

In an alternative configuration, only one part is capable of applying a radial force to the mandrel, the other part only being capable of applying a symmetric force about the mandrel. For example, one part may be an eccentrically bored sleeve and the other may be a concentrically bored sleeve. If the arrangement is envisaged where a concentrically bored sleeve is located on one side of the central plane and an eccentrically bored sleeve is located on the other, then it is possible to form a so-called "point the bit" arrangement. The eccentrically bored sleeve may be located either above or below the central plane of the housing. Two eccentrically bored sleeves oriented at 180° to each other about the mandrel can also achieve this effect.

The paragraph beginning at line 4 page 9 has been amended as follows:

The apparatus may further comprise a plurality of stabiliser shoes. These stabiliser shoes may be circumferentially offset by a predetermined amount in relation to the weight of the housing. More preferably, the apparatus comprises two stabiliser shoes. The stabiliser shoes which may be blades, wedges etc. extend radially outward and laterally along the circumference on either side of the outer eccentric sleeve or outer housing.

The paragraph beginning at line 10 page 9 has been amended as follows:

Figure 1 shows an elementary cutaway side elevational view of an apparatus according to an embodiment of the invention utilizing eccentric sleeves in a slightly inclined wellbore having its low-side on the left;

The paragraph beginning at line 13 page 9 has been amended as follows:

Figure 2 is an elementary side elevational view of the tool of Figure 1, having a weighted side on the ~~left~~ right and illustrating the position of the stabilizer shoes;

The paragraph beginning at line 17 page 9 has been amended as follows:

Figure 4A is an elementary cross section of the tool of Figures 2 and 3 taken at 4A-4A in Figures 2 and 3;

The following paragraph has been added beginning at line 19 page 9:

Figure 4B is an elementary cross section of the tool of Figures 2 and 3 taken at 4B-4B in Figures 2 and 3;

The paragraph beginning at line 4 page 10 has been amended as follows:

Figure 6 is a tool according to another embodiment of the present invention utilizing an eccentric sleeve and a concentric sleeve;

The paragraph beginning at line 11 page 10 has been amended as follows:

Figure 9 is an elementary cross section of the device, showing the fluid pressure signaling means, taken at 8A-8A in Figure 8; ~~and~~

The following paragraph beginning at line 22 page 10 has been deleted:

~~Figure 12C is a suggested diagrammatic Bottom Hole Assembly used for up/down and left/right correction;~~

The paragraph beginning at line 4 page 11 has been amended as follows:

Figure 14 is a schematic of a device according to a preferred embodiment of the invention and ~~comprising~~ containing a sensor.

The following paragraphs have been added following the word "sensor" at line 5 page 11 and immediately before the heading "Detailed Description of the Invention" at line 6 page 11:

Figure 15 is an elementary cross section of the tool of Figures 1 and 6 taken at 15A – 15A in Figures 1 and 6;

Figure 16 is an elementary cross section of the tool of Figure 6 taken at 16A – 16A on Figure 6;

Figures 17 are conceptual drawings showing how the upper and lower inner sleeve portion interact with the inner sleeve to arrive at bit offset and bit point. Figure 17A shows the instant

device with two eccentric sleeves; whereas, Figures 17B and 17C show the device with one concentric sleeve and one eccentric sleeve; and

Figures 18 are simplified diagrams distinguishing between bit offset and bit point. Figure 18A shows bit offset and Figure 18B shows bit point.

The paragraph beginning at line 10 page 14 has been amended as follows:

The inner sleeve 12 of the example has two parts, an upper part 12a and a lower part ~~12b~~ 12d. In the device 10 of Figure 1, both the upper part 12a and the lower part ~~12b~~ 12d have an eccentric bore for receiving the mandrel 11. The upper part 12a is located close to the top end of the device 10 and the lower part 12d is located towards the lower part of the device 10. The upper and lower parts of the inner sleeve are spaced apart from one another along the length of the mandrel 11.

The paragraph beginning at line 16 page 14 has been amended as follows:

An essentially tubular housing, which will be referred to as outer housing 13 completes the device 10 as shown in the Example of Figure 1. In the example of Figure 1, the outer housing 13 houses the middle part 11a of the mandrel 11. The upper 12a and lower ~~12b~~ 12d parts of the inner sleeve are located at the upper and lower ends of the housing 13 respectively, such that the housing 13 only covers a portion of each of the upper and lower parts of the inner sleeve 12a, ~~12b~~ 12d.

The paragraph beginning at line 1 page 15 has been amended as follows:

-- The pregnant portion 20, of the outer housing forms the heavy side of the outer housing and is manufactured as a part of the outer ~~sleeve~~ housing. The outer housing 13 is freely rotatable under gravity such that the pregnant portion 20, will always seek the low side of the wellbore. In

operation, the position of the inner sleeves is set with respect to the position of the pregnant portion 20 of the outer housing. Therefore, the inner sleeve 11 is moveable with respect to the outer housing. --

The paragraph beginning at line 7 page 15 has been amended as follows:

Figures 2 and 3 are external views of the device 10. The device is shown without upper adapter sub 4 or drill bit 7. The upper and lower parts 11b and 11c of the mandrel are respectively located at the top and bottom of the device 10. Adjacent the upper and lower parts 11b and 11c of the mandrel 11 are located the upper and lower parts 12a and ~~12b~~ 12d of the inner sleeve. Viewed from the outside, the outer housing 13 is located between the upper 12a and lower ~~12b~~ 12d parts of the inner sleeve. As explained with reference to Figure 1, the upper and lower parts of the inner sleeve 12 are partially located within the housing 13. The position of the pregnant portion 20 of housing 13 is shown in outline.

The paragraph beginning at line 16 page 15 has been amended as follows:

Stabiliser shoes 21 are located on the outside of housing 13. In this particular example, three stabiliser shoes are located around the circumference of the housing 13. The shoes are elongate and are aligned parallel with the rotation axis of the device 10. The shoes 21 are positioned at 90° intervals from one another. As there are only three shoes, they do not extend around the whole circumference of the outer housing. The shoes 21 are arranged so that there is a first shoe 180° away from the weighted portion, with two shoes positioned on either side of the first shoe. The shoes 21 serve to counter any reactionary rotation on the part of the outer housing caused by bearing friction between the rotating mandrel, 11, and the inner ~~eccentric~~ sleeve, 12, and to center the housing 13, within the borehole 2.

The paragraph beginning at line 20 page 16 has been amended as follows:

The bearings between the inner rotatable mandrel and the inner ~~eccentric~~ sleeve, 12, pose a number of interesting problems. If the tool is used in conventional drilling, the inner mandrel must be capable of turning at speeds of up to 250 RPM within the inner ~~eccentric~~ sleeve. If the tool is used with downhole motors, the bearing speed will depend on the position of the downhole motor with respect to the tool, but may be substantially higher than the 250 RPM used in normal drilling. The downhole motor may be placed at either end of the tool. If the motor is placed next to the bit, then the rotational bearing speed will be zero. If the tool is placed between the downhole motor and the bit, the rotational speed will be the same as that of the output shaft of the downhole motor. This speed can be higher than 250 RPM, which is normally regarded as the maximum RPM encountered in conventional rotary drilling.

The paragraph beginning at line 15 page 17 has been amended as follows:

The rotation between the outer housing, 13, and the inner ~~eccentric~~ sleeve, 12, is controlled from the surface and is an 'on demand' occurrence. Thus, these bearing surfaces need not take high continuous rotation speeds and standard sealed bearings may be used. --

The paragraph beginning at line 19 page 17 has been amended as follows:

Figure 4A shows a cross section of the tool 10 through line 4A-4A[[']] of Figure 3. In Figure 4A, the pregnant portion 20 of the outer housing 13 locates itself at the low side of the wellbore 2. The stabiliser shoes 21 located on the circumference of the outer housing are arranged such that the middle shoe is located against the high side of the wellbore 2 with the other two shoes located on the right and left sides of the wellbore 2. The inner sleeve 12 is located within the bore of the housing 13. Previously, the inner sleeve 12 has been described in terms of two parts, an upper 12a and a lower part ~~12b~~ 12d. Figure 4 just shows the upper part 12a of the sleeve. However, it will be appreciated by those skilled in the art that the lower part ~~12b~~ 12d of the sleeve 12 could also be used in this cross section. The inner sleeve 12 is eccentrically bored. The mandrel 11, or more correctly, the central part of the mandrel 11a is

located within the bore of the inner sleeve 12. The inner sleeve 12 can be rotated with respect to the pregnant part 20 of the outer housing 13 thus changing the force on the mandrel 11.

The paragraph beginning at line 3 page 18 has been amended as follows:

Figure ~~4A~~ 4B shows a cross section through line 4B-4B[[']] of Figure 3. In this part of the tool, there is no outer housing 13 or inner sleeve 12. The figure just shows the mandrel 11, with its concentric bore. Three secondary stabiliser shoes 14 are located symmetrically about the mandrel 11.

The paragraph beginning at line 23 page 18 has been amended as follows:

The inner sleeve 12 has an upper portion 12a and a lower portion ~~12b~~ 12d. In this specific example, both portions are moved together. Both portions are drawn with an inclined line which shows the position of the ~~heavy~~ wide side of the inner sleeve 12. This line is a result of the internal cam like form of the inner sleeve. The ~~cam~~ inner sleeve, of necessity has a wider side and a narrower side.

The paragraph beginning at line 1 page 19 has been amended as follows:

For the sake of clarification, whenever the radial placement of the wider part of the ~~cam~~ inner sleeve is in a certain attitude with respect to the borehole, forces generated by the ~~cam~~ inner sleeve section will deviate the borehole in a vector at 180 degrees relative to the radial position of the wider section. --

The paragraph beginning at line 5 page 19 has been amended as follows:

The widest part of the ~~cam~~ inner sleeve which is closest to the outer housing 13 (as drawn) defines the position of the bias of the inner sleeve.

The paragraph beginning at line 25 page 19 has been amended as follows:

Figure 6 shows a further embodiment of the present invention. To avoid unnecessary repetition, ~~the same~~ similar reference numerals have been used as for Figure 1. The construction of the mandrel 11 and the outer housing 13 are identical to those described for Figure 1. However, the upper part of the inner sleeve differs from that shown in Figure 1 in that the upper part of the inner sleeve ~~12a~~ 12c is concentrically bored. This combination of a concentric upper sleeve, 12c, and an eccentric lower sleeve ~~12b~~ ,12d, allows more control over the drilling direction, and has substantial arrangement with respect to the drilling mechanics. Further, this relatively simple arrangement whereby only movement of the upper sleeve is required is particularly advantageous. This so-called "point-the-bit" arrangement can also be achieved if the lower sleeve ~~12b~~ is concentric and the upper sleeve ~~12a~~ is eccentric.

The paragraph beginning at line 8 page 20 has been amended as follows:

The forces which are created in a "point-the-bit" scenario may differ from those ~~utilized~~ created when two eccentric ~~cams~~ sleeve portions are provided. (See Figure 1.) In a configuration comprising an eccentric ~~cam~~ sleeve portion and a concentric ~~inner~~ sleeve ~~section~~ portion, the net effect is to tilt the bit off the axis and thus give some degree of tilt to the bit cutting structure. Such an arrangement would give considerable advantages when drilling the wellbore and may result in a cleaner profile to the wellbore, a desirable state of affairs particularly when drilling extended reach well profiles.

The paragraph beginning at line 15 page 20 has been amended as follows:

~~If the concentric sleeve section is placed closer to the bit than the cam, the net effect of the cam section will be lower than that where the cam section is placed closer to the bit than the concentric sleeve. Therefore, to achieve the same degree of wellbore curvature from both~~

~~configurations, a larger offset cam would be required if the cam was at the upper end of the tool.~~ Figures 17A and 17C respectively show the conceptual difference between the arrangement of the upper inner sleeve portion, 12a, and the lower inner sleeve portion, 12d, (both eccentric) shown in Figure 1 and the arrangement of the upper inner sleeve portion, 12c, and the lower inner sleeve portion, 12d, shown in Figure 6 (one concentric – one eccentric). As the previous paragraph implies either one of the inner sleeve portions may be concentric or eccentric. Figures 18 show how the forces operate within the wellbore. Two eccentric sleeve offset the bit (Figure 18A); whereas, one eccentric sleeve and one concentric sleeve point the bit (Figure 18B).

The paragraph beginning at line 20 page 20 has been amended as follows:

The pregnant portion 20 of the outer housing 13 provides the reference point or "earthing point" against which the bit bias is referenced. The actual bias forces are applied to the appropriate side of the wellbore through one of the stabiliser shoes 21. In use, the mandrel of the tool would be rotating. It is important that rotation of the mandrel 11 does not cause the outer housing 13 to rotate. Therefore, it is important that the rotational torque transferred to the outer housing from the rotating mandrel 11 does not exceed the self-righting torque mass of the outer ~~sleeve~~ housing 13 due to gravity. If the outer housing 13 turns away from the reference on the low side of the hole, the bit bias will not be correct and the directional qualities of the device will fail. Therefore, it may be necessary to use different speeds for rotating of the mandrel 11 in order to overcome the mass torque limitations of the outer housing 13.

The paragraph beginning at line 25 page 21 has been amended as follows:

It should be noted that the inner ~~eccentric~~ sleeve can be manufactured with varying degrees of eccentricity or offset from the wellbore center-axis. The required eccentricity would depend on the formation, the diameter of the wellbore, speed of drilling, type of drilling,

maximum projected course alternation of the wellbore and the like. The vector interaction of the shoe with the wellbore wall is selectively controlled by the rotation of the inner sleeve; thus, the magnitude of the offset force is dictated by the ratio of the inner sleeve's eccentricity. A smaller ratio being equal to a smaller vector force and a larger ratio being equal to a larger vector force. The offset can vary from tenths of an inch [millimeters] up to inches [centimeters], and ideally, should be field replaceable and adjustable. The larger the offset, the sharper the change in wellbore direction and the higher the load on the internal bearings. In drilling a straight wellbore the eccentricity offset should be less than about 1/2-inch [1.27 cm].

The paragraph beginning at line 11 page 23 has been amended as follows:

Figure 7B shows a variation on the arrangement of Figure ~~8A~~ 7A. Here, a rack is provided around the inner circumference of the outer housing 13. The weighted side of inner sleeve 12 is provided with pinion 25. Movement of the pinion 25 effects movement of the outer housing 13 in a similar manner to that which was described with reference to Figure 7A.

The paragraph beginning at line 3 page 24 has been amended as follows:

The preferred technique will be described for the motion of a single part of the inner sleeve which is illustrated in Figures 8 and 9. A passageway, 17, is bored in the rotating mandrel which allows some drilling fluid to exit the bore via additional offset passages bored in the inner sleeve, 16, and in the outer housing, 15. The passageway, 17, in the rotatable mandrel terminates in bit-jet/orifice, 19, combination. The bit-jet is capable of taking the pressure drop without damage. A groove, 18, is cut in the outer surface of the inner ~~eccentric~~ sleeve 12 which allows the drilling fluid to exit the bore even if the passages, 15,16, are not aligned. When the passages, 15,16, are aligned, the rate of drilling fluid leaving the bore is higher than the rate when the passages are not aligned. Thus, a pressure difference signal would occur at the surface whenever the inner sleeve is toggled or switched from one position to another.

The paragraph beginning at line 12 page 26 has been amended as follows:

A communications device comprising a magnet [[4]] 28 is attached to said rotating member 11. The magnet is located in a pocket on said rotating member 11. This specific embodiment uses the magnet as an emitter. However, it will be appreciated by those skilled in the art that the magnet could be replaced by any type of emitting sensor.

The paragraph beginning at line 16 page 26 has been amended as follows:

The outer housing 13 contains instrument barrels 6. The instrument barrels 6 are provided with sensing means. During drilling of the well bore 2, the heavy portion of the outer housing seeks the low side of the well bore and the position of the outer housing remains relatively fixed with respect to the well bore. The mandrel 11 and magnet 4 rotate relative to the outer housing 13. Lines of flux 5 radiate from the magnet 4 with sufficient magnitude to overcome the Earth's ambient field. The flux lines 5 extend radially beyond the instrument barrel 6 such that sensors within the instrument barrel 6 can detect the intensity of the emitted magnetic field.

The paragraph beginning at line 24 page 26 has been amended as follows:

When the magnet [[4]] 28 is rotated such that it is closest to the sensors in the instrument barrel 6, the sensors detect a maximum amplitude in the magnetic field. In a similar manner, when the magnet [[4]] 28 is furthest from the instrument barrel 6, a minimum in the amplitude of the magnetic field will be detected. The field detected by the sensors may be sinusoidal if it is possible to sense the radiated magnetic field at all times when the mandrel 11 is rotating. In order to accomplish this, at least a part and possibly the entire drill string mandrel will have to be constructed from austenic type materials, or materials with similar non-magnetic properties.

The paragraph beginning at line 19 page 27 has been amended as follows:

Inevitably, there will be material between the magnetic sensor in the instrument barrel 6 and the magnet [[4]] 28 located on the rotating member. This intervening material should, as far as possible, be magnetically transparent. In other words, the magnetic field should pass through this material without becoming deflected or distorted. Materials which exhibit these properties include austenic stainless steels and other non-ferrous material.

The paragraph beginning at line 25 page 27 has been amended as follows:

Figure 11 shows an embodiment of the present invention. As in Figure 1, the downhole tool is connected to a drill bit and an adapter sub [[4]] 30. In Figure 11, the lower part of the mandrel 11 is connected to the drill bit 7 by adapter sub [[6]] 3.

The paragraph beginning at line 1 page 28 has been amended as follows:

The upper adapter sub [[4]] 30 allows the tool 10 to be connected to surveying tools ~~5~~ 29 and drill collars 8. The drill collars are attached to drill string 9. Additional stabilisers (not shown) will be added as per standard drilling procedures.

The paragraph beginning at line 11 page 28 has been amended as follows:

As previously explained, the tool can provide directional control both up and down and left to right. For up/down control the offset provided by at least one of the parts of the direction control means is provided either next to the weighted side of the housing or opposite the position of the weighted side of the housing.[[.]] Figure 12B is a diagrammatic representation of a device used to control up/down only. Here the bit, 7, is followed by a near bit stabilizer, 24, with the up/down tool 10~~M~~, placed at distance "*l*" from the bit. This distance would range between 15 feet [4.57 m] and 30 feet [9.14 m]. (the use of the British System of units is the standard of the drilling industry; hence, this description uses the industry standard.)

The paragraph beginning at line 1 page 29 has been amended as follows:

To avoid unnecessary repetition, where appropriate, like reference numerals will be used to denote like features. Comparing Figure 13 with the cross-sections of Figure 7A and 7B, it can be seen that a weighted housing 13 is provided which surrounds mandrel 11a. Mandrel 11a is located within sleeve 12. Mandrel 11a is free to move within sleeve 12. Sleeve 12 is connected to housing 13 via three linear actuators, 31, 33 and 35. The three linear actuators 31, 33 and 35 are disposed in a plane about said mandrel and are offset from one another by 120°. Each of the linear actuators is configured such that it can extend or contract as required.

The paragraph beginning at line 17 page 29 has been amended as follows:

Figure 14 is a schematic illustrating a preferred embodiment of a device in accordance with the invention where the device further comprises a sensor, 37.

NOTE - the use of double brackets *[[ ]]* has been employed in several of the mark-ups where the use of strikethrough would not easily be perceived. I.e., the number "4" and punctuation marks.

In the Claims

1. (Amended) An apparatus for selectively controlling the direction of a well bore comprising:

a mandrel rotatable about a rotation axis;

a direction controller comprising ~~at least two~~ three parts configured to apply a force to ~~said~~ the mandrel ~~with~~ having a component perpendicular to the ~~said~~ rotation axis and having a component parallel to the rotation axis wherein the mandrel freely rotates within the direction controller;

a housing having an eccentric longitudinal bore forming a weighted side and being configured to freely rotate under gravity about the rotation axis wherein the housing contains the direction controller; and

a driver for selectively varying the angle of the force relative to the weighted side of the housing about ~~said~~ the rotation axis[[,]] wherein the driver ~~being~~ is configured to move the ~~two parts~~ direction controller independently of ~~one another~~ the housing.

2. (Cancelled - all rights retained for subsequent filing)

3. (Amended) The apparatus of claim 1, wherein ~~said at least two~~ the parts are configured to apply a null force to ~~said~~ the mandrel.

4. (Amended) The apparatus of claim 1, wherein the direction controller comprises a single sleeve with an eccentric bore to receive ~~said~~ the mandrel, ~~said~~ the driver being configured to selectively rotate said sleeve about the rotation axis relative to the housing.

5. (Amended) The apparatus of claim [[4]] 1, wherein ~~said sleeve~~ the direction controller comprises a first ~~part which has a~~ sleeve with an eccentric bore, ~~and~~ a second ~~part which has a~~ sleeve with an eccentric bore and a third sleeve extending between the sleeves.

6. (Amended) The apparatus of claim[[4]] 1, wherein ~~said sleeve~~ the direction controller comprises a first ~~part which has~~ sleeve with an eccentric bore ~~and~~, a second ~~part which has~~ sleeve with a concentric bore[[,]] ~~wherein the first and second parts are~~

~~located on opposite sides of the centre line of the housing~~ and a third sleeve extending between the sleeves.

7. (Amended) The apparatus of claim 5, wherein the driver ~~means~~ is configured to move ~~at least two parts of said~~ the sleeves independently of one another.

8. (Amended) The apparatus of claim [[7]] 6, wherein ~~said two parts are configurable to provide a null force on said mandrel~~ the driver means is configured to move the sleeves independently of one another.

9. (Original) The apparatus of claim 4, wherein said sleeve is at least partially located within said eccentric bore of said housing.

10. (Cancelled - all rights retained for subsequent filing - all rights retained for subsequent filing)

11. (Cancelled - all rights retained for subsequent filing)

12. (Cancelled - all rights retained for subsequent filing)

13. (Cancelled - all rights retained for subsequent filing)

14. (Cancelled - all rights retained for subsequent filing)

15. (Cancelled - all rights retained for subsequent filing)

16. (Cancelled - all rights retained for subsequent filing)

17. (Amended) An apparatus for selectively controlling the direction of a wellbore[[,]] ~~the apparatus~~ comprising:

a mandrel ~~which is rotatably~~ rotatable about a rotation axis;

a direction controller comprising ~~at least one linear actuator~~ a plurality of parts configured to apply a vector force to ~~said~~ the mandrel;

a housing having an eccentric longitudinal bore forming a weighted side and being configured to freely rotate under gravity; and

[[a]] drive means for selectively varying the angle of the force relative to the weighted side of the housing about ~~said~~ the rotation axis the drive means being configured to move the direction controller independent of the housing, and

wherein the mandrel freely rotates within the direction controller and wherein the housing contains the direction controller.

18. (Original) The apparatus of claim 1, further comprising a plurality of stabiliser shoes provided on the outside of said housing.

19. (Original) The apparatus of claim 18, wherein the plurality of stabiliser shoes are circumferentially offset by a predetermined amount in relation to the weight of said housing.

20. (Original) The apparatus of claim 18, having two stabiliser shoes.21. (Amended) The apparatus of claim 1, wherein the driver is configured to change the direction within a tolerance ~~of at most~~ between 5°[[,]] ~~more preferably at most~~ and 1°.

22. (Amended) The apparatus of claim 1, wherein the driver comprises an ~~hydraulic or~~ electric motor[[,]] ~~or the like~~.

23. (Original) The apparatus of claim 1, further comprising logic means for determining when the direction of the force applied by said direction controller should be moved.

24. (Original) The apparatus of claim 23, wherein said logic means comprises a sensor for sensing drilling parameters and decoding such parameters to determine when the direction of the force applied by said direction controller should be changed.

25. (Original) The apparatus of claim 23, wherein said logic means comprises a sensor for sensing well bore fluid flow pulses and decoding said pulses to determine when the direction of the force applied by said direction controller should be changed.

26. (Original) The apparatus of claim 23, wherein the logic means further comprises means for decoding and commanding said driver to change the direction of said force relative to the housing.

27. (Original) The apparatus of claim 23, wherein said driver and said logic means are stored with said housing.

28. (Original) The apparatus of claim 23, wherein said logic means are located within a tubular housing connected at least one of the mandrel, direction controller or housing.

29. (Original) The apparatus of claim 23, further comprising an energy source for supplying power to the driver and/or the logic means.

30. (Original) The apparatus of claim 1, wherein the mandrel comprises a

longitudinal bore and said bore is capable of passing wellbore fluids.30.

31. (Amended) The apparatus of claim 1, further comprising signalling means for signalling the direction of the force relative to the ~~heavy~~ weighted side of the housing.

32. (Amended) The apparatus of claim 24, wherein ~~said~~ the mandrel is connected to a drill string wherein ~~said~~ the drilling parameters include drill string rotation and ~~said~~ the logic means includes means for detecting drill string rotation wherein said drill string rotation determines when ~~direction~~ the angle of ~~said~~ the force is changed with respect to ~~said~~ the outer housing.

33. (Cancelled - all rights retained for subsequent filing)

34. (Original) The apparatus of claim 24, wherein said mandrel is connected to a drill string wherein said drilling parameters include drill pipe rotation and said logic means includes means for detecting drill string rotation and determining a time period between rotation and non-rotation of the drill string wherein said time period determines when the angle of said force should be changed with respect to the weighted side of said housing.

35. (Cancelled - all rights retained for subsequent filing)

36. (Cancelled - all rights retained for subsequent filing)

37. (Cancelled - all rights retained for subsequent filing)

38. (Cancelled - all rights retained for subsequent filing)

39. (Cancelled - all rights retained for subsequent filing)

40. (Cancelled - all rights retained for subsequent filing)

41. (Cancelled - all rights retained for subsequent filing)

42. (Cancelled - all rights retained for subsequent filing)

43. (Cancelled - all rights retained for subsequent filing)

44. (Cancelled - all rights retained for subsequent filing)

45. (Cancelled - all rights retained for subsequent filing)

46. (Cancelled - all rights retained for subsequent filing)

47. (Original) The apparatus of claim 1, wherein said driver comprises a drive wheel and a track, said drive wheel being engagable with said track such that movement of

said drive wheel causes movement of said track relative to said drive wheel and said drive wheel when stationary prevents movement between said track and drive wheel, the drive wheel and track being located such that movement of the drive wheel effects relative movement between the force and the weighted side of the housing.

48. (Original) The apparatus of claim 47, wherein said track is located on a surface of said housing and said drive wheel is mechanically connected to said direction controller.

49. (Original) The apparatus of claim 47, wherein the track is located on an inner surface of said housing.

50. (Original) The apparatus of claim 47, wherein said track is located on a surface of said direction control means and said drive wheel is mechanically connected to said housing.

51. (Amended) The apparatus of claim [[50]] 1, wherein ~~the track is located on an outer surface of said direction control means~~ the driver comprises a hydraulic motor.

52. (Original) The apparatus of claim 47, wherein said drive wheel comprises a plurality of teeth about its edge, and said track comprises a plurality of teeth which are configured to interlock with the teeth of said drive wheel to effect relative movement therebetween.

53. (Original) The apparatus of claim 47, wherein the direction of the force is changed by a predetermined angle in response to rotation of said drive wheel through a predetermined rotation angle.